Attorney Docket No. FASV-137-C1

METHOD FOR COOLING A MOTOR IN A BLOWER ASSEMBLY FOR A FURNANCE

TO ALL WHOM IT MAY CONCERN:

BE IT KNOWN THAT WILLIAM S. GATLEY, citizen of the United States of America and resident of Cassville, County of County, State of Missouri and, Fasco Motor Group, the assignee, a corporation of the United States of America and a corporation of Missouri, County of County, State of Missouri, has invented certain new and useful improvements entitled as set forth above of which the following is a specification:

ANTHONY M. LORUSSO, ESQ.
Reg. No. 25059
Lorusso & Loud
440 Commercial Street
Boston, MA 02109
TEL: (617) 227-0700
FAX: (617) 723-4609

STATEMENT OF GOVERNMENT INTEREST

Not Applicable.

CROSS-REFERENCE TO RELATED APPLICATIONS

A claim of benefit is made to U.S. Provision Application Serial No. 60/140,144 filed June 21, 1999, the contents of which are incorporated herein by reference. This application is a continuation of the provisional application Serial No. 60/140,144 entitled, ``80+ Blower and Furnace Venting Method'' and filed June 21, 1999, the teachings of which are incorporated herein by reference.

BACKGROUND OF THE INVENTION

(1) Field of the Invention

This invention relates generally to a method for cooling a motor in a blower assembly for a furnace. More particularly, the present invention relates to a method of cooling an electric motor without an auxiliary fan in a blower assembly.

(2) Description of Related Art

Typically, many gas-furnaces use induced draft blower assemblies to control flue gas by removing the burnt by-products. These blowers are designed to produce a certain amount of airflow. The motor's shaft extends radially into the

blower's housing where an impeller is attached to the motor shaft. The blower housing typically has one inlet and one outlet. Combustion gases are drawn into the housing by the rotating impeller that expels the gases through the outlet into a flue or similar avenue of exit.

With respect to motor cooling, the gases that are forcibly moved through the housing by the impeller do not come into contact with the motor. Thus, blower activity does not in any way contribute to the cooling of the motor.

As is known in the state of the art for conventional motor and furnace assemblies, auxiliary fans are provided on the rotating shaft of a blower motor to draw air into the motor housing to cool the motor. The furnace electronics are located in the vestibule area of the motor casing where the air temperature can often reach 150°. The inevitable exposure of the electronics to the vestibule heat shortens the working life of the electronics. Typically vents are provided in the motor housing to allow for the entry and exit of cooling air.

There are three notable drawbacks associated with the presence and operation of fans in a blower motor assembly. First, the fan inevitably creates drag on the operating motor and reduces motor efficiency with respect to the task of drawing in and expelling exhaust gases from an operating furnace. Second, the fan inevitably generates unwanted noise. Third, the

presence of one or more fans increases the overall length of the blower motor assembly. In an effort to solve these numerous related problems, a method for venting the air in a furnace or blower housing assembly has now been achieved that optimizes the intake of combustion air and the expulsion of exhaust gases while providing a ``cool-to-the-touch'' blower housing.

It is an object of the present invention to provide a method for cooling the motor that eliminates the need for an auxiliary fan. Another object of the invention is to reduce noise levels produced by a blower by eliminating the auxiliary fan. A further object of the invention is to reduce overall blower motor height to allow for more streamlined furnaces. A yet further object of the invention is to provide a means of eliminating heat sources near the electronics in the vestibule portion of a furnace to which the blower is attached. These and other objects are accomplished from the following described blower.

Summary of the Invention

This invention relates to a method of cooling a motor in a blower assembly that thereby eliminates the need to have an auxiliary fan to cool the motor.

According to the invention the assembly blower or motor casing has at least one hole or aperture located anywhere on the

motor case to allow for the flow of air into the motor case. The combination of the aperture on the motor case and impeller back plate aperture allows for external air to be drawn into the blower over the motor and into the impeller portion of the blower housing and out an exhaust port situated in the blower housing.

The new method eliminates the need for an auxiliary fan to cool the motor, thereby, reducing the overall length of the assembly. This method not only provides a motor case that is self cooling but also provides the additional benefit of being cool to the touch. Finally, this method provides for the reduction of noise by the elimination of the fan.

These and other objects and features of the present invention will be apparent from a review of the drawings and a reading of the following detailed description of the invention.

Brief Description of the Drawings

FIG. 1 is a perspective view of a traditional blower assembly with a motor housing according to one embodiment of the invention.

FIG. 2 is an end view of a motor housing **10** as shown in FIG. 1.

FIG. 3 is a perspective view of a motor housing **10** as shown in FIG. 1.

Detailed Description of the Invention

Referring to FIGS. 1-3, a method for cooling a motor in a blower housing assembly for furnaces according to one embodiment of the invention is shown. A motor cover or housing **10** is configured to encompass a motor **12** which comprises a shaft **14**, rotor **16** and stator **18**. Motor cover **10** has portions that define a shaft bushing **20** and mechanical fastener bores **22** for securing motor **12** to motor cover **10**. Motor cover **10** has flanges **24** each of which has portions defining a fastener bore **26** for securing motor cover **10** to a impeller housing **28** which is configured to encompass an impeller **30** which is attached to shaft **14**. Impeller **30** is situated in impeller housing **28** such that impeller **30** can freely rotate within said impeller housing **28**.

Motor cover **10** has at least one hole or aperture **32** located anywhere on motor cover **10** for drawing in air to cool the bearings (not shown) of the motor **12** in the motor cover **10**. In an alternate embodiment, vent aperture **32** can be formed as a plurality of vent slots in other shapes (not shown) or as a combination of apertures.

Impeller **30** has a plurality of fins **34** which provide

surfaces for directing incoming air from motor chamber **38** or exhaust gases from an attached furnace. The incoming air from the motor **12** flows through at least one any size hole or aperture **36** located on the back plate **42** of the impeller housing **28** from the motor case **10** by the impeller **30**.

The method for venting the air in furnaces according to the foregoing description results in a blower design that eliminates the need for an auxiliary fan (not shown) attached to shaft **14**. In this method there is at least one hole or aperture **32** situated anywhere in a motor case or housing **10** that allows for air to enter the housing **10** to cool the bearings (not shown) of the motor **12** and the motor **12** itself in the motor case **10**. The warm air flows across and around the motor **12** in the direction of the impeller housing **28** and through at least one any size hole or aperture **36** located on the back plate **42** of an impeller housing **28** from the motor case **10** by the impeller **30**. An outlet or exhaust pipe **38**

Elimination of an auxiliary fan allows for the reduction in the overall height for the blower housing. This, in turn, allows for a similar reduction in height of a furnace. Coupled with this beneficial effect is the elimination of some of the noise that is inevitably produced by the blower via fan operation. Also maximized is the elimination of the heat source near the furnace electronics that are at least partially contained in the furnace vestibule.

It is further possible to eliminate much of the heat that is generated in the vestibule of a furnace. Temperatures which typically reach 150°F can be reduced to 90°F by using the novel venting method. The blower can be sealed off to the furnace for fresh air intake. Optionally, the blower can be sealed off to the furnace door to allow for the total sealing of the inducer compartment to maximize blower efficiency. Such a configuration maximizes the drawing of motor heat into the impeller chamber and out an outlet pipe **38** which is in fluid communication with the impeller housing **28**. Also maximized is the elimination of the heat source near the furnace electronics which are at least partially contained in the furnace vestibule.

Numerous alternatives and embodiments exist for the invention such as modifications of the motor housing geometric configuration, integral versus modular motor cover and impeller housing, single large vent aperture versus a plurality of vent slots in the motor cover.

It is to be understood that the present invention is by no means limited to the particular constructions herein disclosed and/or shown in the drawings, but also comprises any modifications or equivalents within the scope of the claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. A method of cooling the bearings of a furnace motor that drives an impeller comprising:

rotating the impeller to draw air through a vent in a motor housing whereby the air flows around the motor situated within the motor housing into the direction of an impeller housing to cool the motor bearings thereby eliminating the need of a separate auxiliary fan;

drawing air from the motor housing through a hole or aperture situated anywhere in the impeller back plate;

removing air from the impeller housing via an exhaust port situated in the impeller housing.

2. A furnace motor comprising:

a motor in a housing;

a vent in the housing to allow air to flow over the motor;

an impeller connected to the motor by a motor shaft, said

impeller being enclosed in an impeller housing, said impeller housing having an inlet port connected to said motor housing, and an exhaust port for the removal of the combustion gases that are drawn into the housing by the rotating impeller.

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